AMENDMENTS TO THE CLAIMS

1. (Original) An optical fiber sensor comprising

an optical fiber portion for transmitting light and

a mode restriction releasing means including a light permeable member melt bonded to a front end of the optical fiber portion, guiding at least a portion of the light transmitted by the optical fiber portion to the outside of a core to release the restriction of the mode of the light, and returning the light released in the restriction of the mode into the core.

2. (Original) An optical fiber sensor as set forth in claim 1, wherein said mode restriction releasing means is a hetero core provided with a light transmitting core having a different diameter from the core of the optical fiber portion and able to transmit light propagated through the core and shorter in comparison with the length of the optical fiber portion.

3. (Original) An optical fiber sensor as set forth in claim 2, further comprising with a metal film provided at a surface side of said hetero core and generating surface plasmon by reflection of light in the hetero core at that surface.

4. (Original) An optical fiber sensor as set forth in claim 2, wherein a detection chemical selectively reacting with a detection object at the outside of said hetero core and giving a change in accordance with that reaction to the light in the hetero core is immobilized at a surface side of said hetero core.

5. (Original) An optical fiber sensor comprising

an optical fiber portion for transmitting light and

a hetero core provided with a light transmitting core having a different diameter from the core of the optical fiber portion and able to transmit light propagated through the core, guiding at least a portion of the light propagated through the core from a boundary between the core and the light transmitting core to the outside of the core, and shorter in comparison with the length of the optical fiber portion,

wherein the hetero core is melt bonded to the front end of the optical fiber portion.

6. (Original) An optical fiber sensor as set forth in claim 5, further comprising a metal film provided at a surface side of said hetero core and generating surface plasmon by reflection of light in the hetero core at that surface.

7. (Original) An optical fiber sensor as set forth in claim 5, wherein a detection chemical selectively reacting with a detection object at the outside of said hetero core and giving a change in accordance with that reaction to the light in the hetero core is immobilized at a surface side of said hetero core.

8. (Currently Amended) An optical fiber sensor as set forth in ~~any one of claims 2 to 7~~ claim 2, further comprising a reflection means for reflecting light in the hetero core and returning the light to said optical fiber portion side at the surface of the end of the hetero core opposite to the end melt bonded to the optical fiber portion.

9. (Original) A measuring apparatus comprising

an optical fiber sensor having

an optical fiber portion for transmitting light and

a mode restriction releasing means including a light permeable member melt bonded to the front end of the optical fiber portion, guiding at least a portion of the light transmitted by the optical fiber portion to the outside of the core to release the restriction of the mode of the light, and returning the light released in the restriction of the mode to the core;

a light source connected to an optical fiber portion side end of the optical fiber sensor and emitting light to the core of the optical fiber sensor; and

a light detecting means for detecting direct intensity of returned light returning to the light source side via the core subjected to interaction with the outside of the mode restriction releasing means in the mode restriction releasing means.

10. (Original) A measuring apparatus as set forth in claim 9, wherein said mode restriction releasing means is a hetero core provided with a light transmitting core having a different diameter from the core of the optical fiber portion and able to transmit light propagated through the core and shorter in comparison with the length of the optical fiber portion.

11. (Original) A measuring apparatus as set forth in claim 10, further comprising a reflection means for reflecting light in the hetero core and returning the light to said optical fiber portion side at the surface of the end of the hetero core opposite to the end melt bonded to the optical fiber portion.

12. (Original) A measuring apparatus as set forth in claim 10, further comprising a metal film provided at a surface side of said hetero core and generating surface plasmon by reflection of light in the hetero core at that surface.

13. (Original) A measuring apparatus as set forth in claim 12, further comprising a reflection means for reflecting light in the hetero core and returning the light to said optical fiber portion side at the surface of the end of the hetero core opposite to the end melt bonded to the optical fiber portion.

14. (Original) A measuring apparatus as set forth in claim 10, wherein a detection chemical selectively reacting with a detection object at the outside of said hetero core and giving a change in accordance with that reaction to the light in the hetero core is immobilized at a surface side of said hetero core.

15. (Original) A measuring apparatus as set forth in claim 14, further comprising a reflection means for reflecting light in the hetero core and returning the light to said optical fiber portion side at the surface of the end of the hetero core opposite to the end melt bonded to the optical fiber portion.

16. (Original) A measuring apparatus comprising

an optical fiber sensor having

an optical fiber portion for transmitting light and

a hetero core provided with a light transmitting core having a different diameter from the core of the optical fiber portion and able to transmit light propagated through the core, guiding at least a portion of the light propagated through the core from a boundary between the core and the light transmitting core to the outside of the core, and shorter in comparison with the length of the optical fiber portion,

wherein the hetero core is melt bonded to the front end of the optical fiber portion;

a light source connected to the optical fiber portion side end of the optical fiber sensor and emitting light to the core of the optical fiber sensor; and

a light detecting means for detecting direct intensity of returned light returning to the light source side via the core subjected to interaction with the outside of the hetero core in the hetero core.

17. (Original) A measuring apparatus as set forth in claim 16, further comprising a reflection means for reflecting light in the hetero core and returning the light to said optical fiber portion side at the surface of the end of the hetero core opposite to the end melt bonded to the optical fiber portion.

18. (Original) A measuring apparatus as set forth in claim 16, further comprising a metal film provided at a surface side of said hetero core and generating surface plasmon by reflection of light in the hetero core at that surface.

19. (Original) A measuring apparatus as set forth in claim 18, further comprising a reflection means for reflecting light in the hetero core and returning the light to said optical fiber portion side at the surface of the end of the hetero core opposite to the end melt bonded to the optical fiber portion.

20. (Original) A measuring apparatus as set forth in claim 16, wherein a detection chemical selectively reacting with a detection object at the outside of said hetero core and giving a change in accordance with that reaction to the light in the hetero core is immobilized at a surface side of said hetero core.

21. (Original) A measuring apparatus as set forth in claim 20, further comprising a reflection means for reflecting light in the hetero core and returning the light to said optical fiber portion side at the surface of the end of the hetero core opposite to the end melt bonded to the optical fiber portion.

22. (Original) A measuring apparatus as set forth in ~~any one of claims 9 to 21~~ claim 9, further comprising a measuring means for measuring a predetermined characteristic of an environment outside of said optical fiber sensor based on an intensity of said returned light detected by said light detecting means.